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The Implementation of Environmental Topics in the First Cycle of Primary Education from the Teachers' Perspective

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Abstract: This paper presents the findings of a study aimed at exploring teachers' perspectives on environmental education for students in the first to fourth grades of primary school. The issue of environmental education for primary school students has gained significant attention in recent decades and is now seen as an educational necessity. The study's objectives focus on understanding teachers' views on the importance of teaching environmental topics in the first cycle of primary education and evaluating the school's ability to support such teaching. The research was conducted through a survey involving 455 teachers from thirty-five primary schools across eight cities in the Republic of Serbia, using a questionnaire designed specifically for this study. The questionnaire featured a series of questions and rating scales based on a five-point Likert scale. Although there are some differences in respondents' opinions based on factors such as work experience, school location, and the number of environmental seminars attended, the data suggest that teachers generally have positive views on the importance of including environmental topics in the first cycle of primary education. They also express favorable opinions about the conditions necessary to achieve the goals of environmental education in their schools. Teachers recognize the importance of studying environmental topics, not only for gaining knowledge, skills, and experiences but also for fostering students' environmental awareness. The capacity of schools to support environmental education is most strongly influenced by extracurricular activities and various educational programs. This research highlights the crucial role of primary schools in meeting the goals of environmental education and lays the groundwork for further studies in this area, particularly focusing on teachers' professional development and the acquisition of environmental competencies.

Keywords: *environmental education, environmental topics, environmental awareness, teacher, student*

Introduction

Environmental education is a crucial activity focused on fostering and developing environmental awareness in all individuals. A strong sense of environmental awareness is the foundation for cultivating a responsible attitude toward oneself and the environment, establishing effective systems for environmental protection and improvement, and adhering to the principles of sustainable living. The growing environmental crisis, ongoing ecological challenges, and the rapid advancement of scientific discoveries, digital technologies, and new forms of literacy-including environmental literacy-have led to the recognition that environmental education is now a key component of the general culture and education of modern individuals.

Given these developments, environmental education at all levels of education, from preschool to university, is becoming increasingly important within contemporary educational systems. It contributes to understanding the fundamental principles of sustainable development, fostering students' environmental awareness, and preparing them to actively engage in environmental preservation (Stanišić, 2009; Erdogan and Ok, 2011; Chawla and Derr, 2012; Stevenson et al., 2013; Boeve-de Pauw et al., 2015; Ardoin et al., 2018; Boca and Saraçlı, 2019; Rohayati, Safrina, and Purwanto, 2021; Stanišić, 2021; Marušić, Stanišić and Savić, 2022; Cincera, Kroufek, and Bogner, 2023; Stanišić, Maksić, and Nenadić, 2023; Suralin, 2023).

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It is important to highlight that early exposure to environmental topics helps shape a responsible attitude toward nature in children, which can later translate into environmentally responsible behaviors (Brun, 2001; Kundačina, 2010; Erdogan and Ok, 2011; Chawla and Derr, 2012; Ardoin and Bowers, 2020).

Hardly any significant international gathering dedicated to the protection and improvement of the human environment fails to emphasize the crucial role of environmental education. The issues related to global environmental threats, the measures undertaken on this front in various countries, and recommendations from numerous global, international, and regional scientific and professional gatherings have all contributed to the adoption of appropriate measures for environmental protection in the Republic of Serbia as well. A number of these measures pertain to education and the need to adapt the teaching process at all levels to align with the goals and objectives of environmental protection. There is a particular emphasis on the necessity of creating curricula that will enable preschools and schools to educate students on protecting and enhancing their immediate environment. This is especially relevant for primary school-aged students, who are in a period of rapid development, when they shape their needs, interests, habits, and values (Mitić and Stanojević, 2014).

Primary schools play a crucial role in the development of students' environmental awareness and culture. Through its entire environment, including components such as the teaching process, curricula, key participants in education, curricular and extracurricular activities, classrooms as learning spaces, didactic materials, textbooks, and the school's cultural activities, it significantly contributes to environmental education (Kundačina, 2010).

In the Republic of Serbia, the first cycle of primary education does not have a separate subject dedicated solely to environmental topics. Instead, these topics are integrated into two mandatory subjects. In grades 1 and 2, environmental content is covered within *The World Around Us*, while in grades 3 and 4, *Nature and Society* addresses these themes (Spasić Stošić, 2017; Stanišić, Maksić and Nenadić, 2023). These core subjects lay the foundation for developing natural science competencies, which are essential for understanding the many complex phenomena, processes, principles, and laws found in nature and society. They also provide the groundwork for achieving the objectives of environmental education, helping students acquire knowledge, values, attitudes, and pro-environmental behaviors. In grades 1 and 2, *The World Around Us* covers environmental topics as part of lessons on the diversity of nature, human activities, health and safety, and social rules (Curriculum for the Second Grade of Primary Education, 2018). In grades 3 and 4, *Nature and Society* builds upon and expands the previous topics, introducing new subjects such as the physical and chemical properties of materials, living and non-living nature, natural phenomena, recycling, sustainable consumption, and the relationship between humans and the environment (Curriculum for the Third Grade of Primary Education, 2019; Curriculum for the Fourth Grade of Primary Education, 2019).

To achieve the objectives of environmental education, schools not only cover environmental topics in mandatory subjects but also organize extracurricular and out-of-school activities aimed at fostering students' ecological awareness and culture (Regulation on the Plan of Teaching and Learning for the First Cycle of Primary Education and the Curriculum for the First Grade of Primary Education, 2017). Teachers and students engage in a wide range of such activities, including commemorating important environmental dates, cleaning the school building and grounds, planting trees and flowers, organizing local environmental clean-up and beautification projects, collecting materials for recycling, monitoring water and air pollution in the local community, setting up environmental exhibitions of artwork, posters, and photos, hosting lectures, quizzes, and competitions, and participating in contests organized by various environmental protection organizations, among others. These activities are particularly valuable as they encourage the voluntary and self-aware participation of students in extracurricular endeavors based on their interests, fostering cooperation, socialization, competition, and communal life.

It is important to note that instruction that integrates environmental topics helps develop essential skills in students, such as critical thinking, problem-solving, and decision-making—skills crucial for addressing the complex challenges of today (Jukić, 2011; Ardoin et al., 2018; Maksić, 2021). Furthermore, studies indicate that students who undergo an education system focused on environmental education tend to form positive attitudes and values toward nature, contributing to the development of generations ready to take concrete actions to protect the environment (Manoli, Johnson, and Dunlap, 2007; Stanišić, 2009).

However, despite the importance of environmental education, its implementation in schools is influ-

enced by various factors, such as available resources, teaching materials, and teacher training. Research has shown that disparities in the effectiveness of environmental education arise based on the availability of resources in schools and the level of support provided to educators by the community and educational institutions (Ballantyne and Packer, 2009; Stevenson et al., 2013). For instance, schools that successfully incorporate environmental topics into their curriculum often benefit from teacher seminars and training, which allow them to implement these educational programs more effectively (Rickinson, 2001; Boeve-de Pauw and Van Petegem, 2011; Suralin, 2023).

Experiential learning, school projects, and environmental conservation initiatives have proven to be key contributors to enhancing students' environmental awareness and fostering pro-environmental behavior, thereby helping achieve the primary goals of environmental education (Ballantyne and Packer, 2009). These activities not only complement the school curriculum but also foster a sense of responsibility and community engagement, both of which are crucial for the preservation of natural resources. Both theoretical and practical approaches emphasize the importance of an interdisciplinary teaching method, integrating environmental topics with subjects like science, social studies, and art, which helps students develop a comprehensive understanding of environmental issues (Stevenson et al., 2013; Stanišić, Maksić and Nenadić, 2023; Suralin, 2023). This approach allows students to explore the roles of individuals and society in environmental protection from different angles, contributing to their overall development.

Considering the vital role of primary schools in shaping students' environmental awareness and culture, a study was conducted to assess the importance of teaching environmental topics in primary schools in Serbia and to evaluate the current conditions influencing their implementation.

Materials and Methods

The goal of the research was to explore teachers' perspectives on environmental education for students in grades 1 through 4 of primary school, recognizing its role as a crucial component of institutional education and an essential part of modern cultural and educational development. The research focused on assessing teachers' views regarding the significance of environmental topics in the first cycle of primary education, evaluating the conditions for achieving the objectives of environmental education at their schools, and identifying differences in teachers' opinions based on factors such as teaching experience, school location, and the number of professional seminars attended related to environmental education.

The research sample was drawn from primary school teachers across eight cities in Serbia that host teacher education faculties or departments: Vranje, Kosovska Mitrovica, Jagodina, Užice, Belgrade, Sombor, Novi Pazar, and Negotin. A total of 455 teachers from thirty-five primary schools participated in the study. The sample was representative of the research's scope, characteristics, and conditions. Of the respondents, 87.3% were female, and 12.7% were male. The largest group of teachers had between 21 and 30 years of work experience (151 or 33.2%). A smaller group had 11 to 20 years of experience (111 or 24.4%), while a similar number had over 30 years (100 or 22.0%) or fewer than 10 years of experience (93 or 20.4%). In terms of educational qualifications, 258 (56.7%) teachers had a higher education degree, 94 (20.7%) held a vocational degree, 95 (20.9%) had a master's degree, and 8 (1.8%) held a postgraduate master's degree. Regarding the location of the schools, 341 (74.9%) teachers were from urban areas, 65 (14.3%) from rural areas, and 49 (10.8%) from suburban areas. Concerning environmental training, 404 (88.8%) teachers reported having never attended an ecology seminar, which highlights a significant gap in professional development. Only 46 (10.1%) teachers had attended one seminar, 3 (0.7%) had attended two, and 2 (0.4%) had attended three seminars focused on ecological topics.

The research utilized theoretical analysis and the descriptive scientific research method, specifically the survey approach. A custom-designed questionnaire was employed to gather teachers' opinions, consisting of several questions and rating scales structured on a five-point Likert scale. The reliability and internal consistency of the questionnaire were verified using the Cronbach's Alpha coefficient, which was found to be 0.880 (Cronbach's Alpha = 0.880). To analyze the influences, relationships, and differences within the data, appropriate statistical methods were applied: frequencies (f), percentages (%), mean (M), standard deviation (SD), minimum and maximum values, analysis of variance (F), and one-way analysis of variance (ANOVA). Statistical significance was set at the probability level of $p \leq 0.05$ to $p \leq 0.01$, with data analysis conducted using the SPSS statistical program, version 25.

Results

The first research task aimed to determine teachers' opinions on the importance of studying environmental topics in the first cycle of primary education. Respondents were asked to indicate their level of agreement with statements regarding the significance of environmental education topics using a five-point Likert scale. It was hypothesized that teachers would express positive views on the importance of topics that support environmental protection goals. The results, presented in Table 1, show that teachers generally view the significance of studying environmental topics in the first cycle of primary education positively. The mean values (M) suggest strong agreement with the importance of these topics. Items such as "Studying environmental topics in the first cycle of primary education significantly contributes to the development of students' environmental awareness" (M = 4.54) and "By implementing topics about environmental threats and ways to protect it, younger students acquire knowledge, skills, values, experiences, and motivation to address current and future ecological issues" (M = 4.40) received high ratings. The lowest mean values in the first scale were for items 1 (M = 4.19) and 2 (M = 4.30), which still reflect very high ratings.

Table 1. Teachers' opinions on the importance of studying environmental topics

Statements on the importance of studying environmental topics in the first cycle of primary education	N	Min	Max	M	SD
1. The decisive period for environmental education is from the 1st to the 4th grade of primary school.	455	1	5	4.19	.860
2. Introducing students to the impact of humans on the environment in various forms and scopes, and understanding the contemporary trends and possibilities of science and technology for comprehensive environmental protection and improvement can be achieved through studying environmental topics.	455	2	5	4.30	.665
3. By teaching about topics focusing on environmental threats and the possibilities for its protection, younger students acquire knowledge, skills, values, experience, and determination to solve current and future environmental problems.	455	2	5	4.40	.692
4. Studying environmental topics in the first cycle of primary education significantly contributes to the development of students' environmental awareness.	455	2	5	**4.54**	.652

N-number of respondents; Min-minimum; Max-maximum; M-mean; SD-standard deviation

A one-way analysis of variance (ANOVA) was conducted to examine the relationship between the independent variables—work experience, the environment in which the school is located, and the number of environmental seminars attended—and teachers' opinions on the importance of studying environmental topics in the first cycle of primary education.

When exploring the connection between work experience and teachers' views on the importance of environmental topics for grades 1 through 4, it was found that the F test values did not show statistical significance. The data in Table 2 reveal that teachers with varying levels of work experience do not significantly differ in their opinions, as indicated by the mean values ranging from M=4.19 to M=4.54. These results suggest that teachers, regardless of their years of experience, share a strong agreement on the importance of studying topics that support the goals of environmental education. Therefore, it can be concluded that, in relation to work experience, teachers assess the significance of studying environmental topics in primary education similarly.

Table 2. Teachers' opinions on the significance of studying environmental topics in the first cycle of primary education (variable: work experience)

Statements on the importance of studying environmental topics in the first cycle of primary education		N	M	SD	Min	Max	F	p
The critical period for environmental education is the period from the 1st to the 4th grade of primary school.	1-10 years	93	4.16	0.784	1	5		
	11-20 years	111	4.20	0.807	2	5		
	21-30 years.	151	4.17	0.907	1	5		
	> 30 years	100	4.23	0.920	1	5		
	Total	455	**4.19**	0.860	1	5	0.131	0.942
Introducing students to human impact on the environment in various forms and scopes, understanding contemporary trends and the possibilities of science and technology for comprehensive environmental protection and improvement, can be achieved through the study of environmental topics.	1-10 years	93	4.25	0.686	3	5		
	11-20 years	111	4.38	0.589	3	5		
	21-30 years	151	4.23	0.704	2	5		
	> 30 years	100	4.36	0.659	2	5		
	Total	455	**4.30**	0.665	2	5	1.619	0.184
By implementing topics on environmental threats and the possibilities for its protection, younger students gain knowledge, skills, values, experience, and determination to solve current and future environmental problems.	1-10 years	93	4.30	0.763	2	5		
	11-20 years	111	4.46	0.658	2	5		
	21-30 years	151	4.40	0.684	2	5		
	> 30 years	100	4.43	0.671	2	5		
	Total	455	**4.40**	0.692	2	5	0.971	0.406
Studying environmental topics in the first cycle of primary education significantly contributes to the development of students' environmental awareness.	1-10 years	93	4.38	0.658	3	5		
	11-20 years	111	4.58	0.626	3	5		
	21-30 years	151	4.60	0.655	2	5		
	> 30 years	100	4.56	0.656	2	5		
	Total	455	**4.54**	0.652	2	5	2.495	0.059

N-number of respondents; Min-minimum; Max-maximum; M-mean; SD-standard deviation; F-F test; p–significance

Table 3 presents the relationship between teachers' opinions on the importance of studying environmental topics in the first cycle of primary education and the location of the school. The analysis of variance (F test values) reveals no statistical significance related to this variable, meaning that teachers' opinions on the importance of studying environmental topics are similar regardless of the school's location. Notably, teachers from rural areas provide the most positive evaluations regarding the study of environmental topics. Specifically, teachers in rural areas place greater emphasis on the period from grades 1 to 4 as crucial for achieving the goals of environmental education, with mean values of M=4.42. They also believe that teaching topics on environmental threats not only imparts knowledge, values, experience, and determination to address environmental problems (M=4.43) but also has a more significant impact on the development of students' environmental awareness (M=4.60) compared to their urban and suburban counterparts. The mean values above M=4.00 in all three categories indicate very positive views among teachers on the importance of environmental education, regardless of school location.

Table 3. Teachers' opinions on the importance of studying environmental topics in the first cycle of primary education (variable: school location)

Statements on the importance of studying environmental topics in the first cycle of primary education		N	M	SD	Min	Max	F	p
The critical period for environmental education is the period from the 1st to the 4th grade of primary school.	Urban	341	4.14	0.898	1	5		
	Suburban	49	4.20	0.790	2	5		
	Rural	65	**4.42**	0.659	2	5		
	Total	455	4.19	0.860	1	5	2.754	0.065
Introducing students to human impact on the environment in various forms and scopes, understanding contemporary trends and the possibilities of science and technology for comprehensive environmental protection and improvement, can be achieved through the study of environmental topics.	Urban	341	4.29	0.686	2	5		
	Suburban	49	4.35	0.663	2	5		
	Rural	65	4.31	0.557	3	5		
	Total	455	4.30	0.665	2	5	0.181	0.834
By implementing topics on environmental threats and the possibilities for its protection, younger students gain knowledge, skills, values, experience, and determination to solve current and future environmental problems.	Urban	341	4.40	0.702	2	5		
	Suburban	49	4.37	0.668	2	5		
	Rural	65	**4.43**	0.661	3	5		
	Total	455	4.40	0.692	2	5	0.119	0.888
Studying environmental topics in the first cycle of primary education significantly contributes to the development of students' environmental awareness.	Urban	341	4.54	0.644	2	5		
	Suburban	49	4.47	0.767	2	5		
	Rural	65	**4.60**	0.607	2	5		
	Total	455	4.54	0.652	2	5	0.564	0.569

N-number of respondents; Min-minimum; Max-maximum; M-mean; SD-standard deviation; F-F test; p-significance

In examining the relationship between the number of environmental seminars attended and teachers' opinions on the importance of studying environmental topics in the first cycle of primary education, no statistically significant differences were found in respondents' assessments. Table 4 presents the teachers' views on this issue. The data show that teachers who attended only one seminar aimed at preparing them to implement environmental topics placed higher value on studying these topics in the classroom compared to other respondents. They view this period as crucial for developing positive environmental attitudes and beliefs (M=4.33), as it helps students understand human impact on the environment in various ways and the role of science and technology in protecting it (M=4.35). Moreover, they believe students gain the knowledge, skills, and readiness to tackle current and future environmental challenges (M=4.54). However, these differences were not statistically significant. The mean values across all four respondent categories (ranging from M=3.33 to M=4.56) indicate that, regardless of seminar attendance, teachers universally assess the importance of studying environmental topics related to environmental threats and protection as positively, confirming a consistency in their views.

Table 4. Teachers' opinions on the importance of studying environmental topics in the first cycle of primary education (variable: number of environmental seminars attended)

Statements on the importance of studying environmental topics in the first cycle of primary education		N	M	SD	Min	Max	F	p
The critical period for environmental education is the period from the 1st to the 4th grade of primary school.	None	404	4.17	.868	1	5		
	One	46	**4.33**	.818	2	5		
	Two	3	4.33	.577	4	5		
	Three	2	4.00	.000	4	4		
	Total	455	4.19	.860	1	5	0.493	0.687
Introducing students to human impact on the environment in various forms and scopes, understanding contemporary trends and the possibilities of science and technology for comprehensive environmental protection and improvement, can be achieved through the study of environmental topics.	None	404	4.29	.668	2	5		
	One	46	**4.35**	.674	3	5		
	Two	3	4.00	.000	4	4		
	Three	2	4.00	.000	4	4		
	Total	455	4.30	.665	2	5	0.422	0.737
By implementing topics on environmental threats and the possibilities for its protection, younger students gain knowledge, skills, values, experience, and determination to solve current and future environmental problems.	None	404	4.40	.669	2	5		
	One	46	**4.54**	.721	3	5		
	Two	3	3.33	1.155	2	4		
	Three	2	3.50	2.121	2	5		
	Total	455	4.40	.692	2	5	4.261	0.006
Studying environmental topics in the first cycle of primary education significantly contributes to the development of students' environmental awareness.	None	404	4.56	.641	2	5		
	One	46	4.46	.690	3	5		
	Two	3	3.67	.577	3	4		
	Three	2	3.50	.707	3	4		
	Total	455	4.54	.652	2	5	3.933	0.009

N-number of respondents; Min-minimum; Max-maximum; M-mean; SD-standard deviation; F-F test; p-significance

Given that schools influence students' environmental education through various factors, our second research objective focused on examining teachers' opinions about the impact of specific school conditions on achieving the goals and objectives of environmental education. Participants were asked to rate their level of agreement on the influence of particular school factors on students' environmental education using a five-point Likert scale. The research hypothesis proposed that teachers would have a positive view of the conditions within their institutions that support environmental education. The teachers' assessments of school conditions that contribute to environmental protection and improvement are presented in Table 5. According to the findings, teachers generally evaluate the school conditions supporting environmental education in a similar positive light. The calculated mean values (M) for all items reflect favorable assessments of the school environment in terms of promoting students' environmental education and the protection and enhancement of the environment.

Table 5. Teachers' views on whether the school meets the conditions necessary to achieve the goals and objectives of environmental education

Statements about the school's conditions for implementing the goals and objectives of environmental education	N	Min	Max	M	SD
1. The school where I work has adequate conditions for the implementation of the goals and objectives of environmental education (teaching staff, organized school space, teaching materials, professional literature in the field of ecology...).	455	1	5	3.69	.971
2. In the school's annual work plan, sufficient attention is given to the implementation of the goals and objectives of environmental education.	455	1	5	3.86	.905
3. The school where I work organizes a sufficient variety of extracurricular activities that contribute to the development of students' environmental awareness, such as school space beautification, environmental conservation initiatives, recycling programs, observance of dates significant to environmental awareness, public lectures, exhibitions, and environmental pollution research.	455	1	5	3.97	.928
4. Environmental topics play a prominent role in the structure of students' extracurricular activities, especially within various clubs and groups.	455	1	5	3.81	.918
5. The school's educational programs (environmental protection program, cultural activities program, field trip and outdoor learning program, health care program, etc.) include sufficient content aimed at promoting environmental education and awareness among students.	455	1	5	3.97	.853
6. The school where I teach participates in environmental activities organized by institutions and organizations within the local and broader community and maintains ongoing collaboration with them.	455	1	5	3.93	.924

N-number of respondents; Min-minimum; Max-maximum; M-mean; SD-standard deviation

The following section presents the results regarding the differences in teachers' opinions on the conditions for environmental education in schools, based on their work experience, the location of the school, and the number of environmental seminars they have attended.

In the study analyzing the impact of work experience on teachers' views concerning the conditions for achieving the goals of environmental education at their schools, a statistically significant difference was found in item 5 (Table 6) through one-way analysis of variance (ANOVA). The F coefficient (F=0.298) with a significance level of p=0.827 indicates that teachers with 1 to 10 years and 21 to 30 years of work experience rate the inclusion of environmental topics in the school curricula more positively than teachers in other experience categories. The data also show that no statistical significance was found in the other items, suggesting that teachers' assessments of the school conditions for environmental education are similar across different levels of work experience.

Table 6. Teachers' views on the school's conditions for achieving the goals and objectives of environmental education (variable: work experience)

Statements about the school's conditions for achieving the goals and objectives of environmental education		N	M	SD	Min	Max	F	p
The school where I work has adequate conditions for the implementation of the goals and objectives of environmental education (teaching staff, organized school space, teaching materials, professional literature in the field of ecology, etc.).	1-10 years	93	3.83	0.974	2	5		
	11-20 years	111	3.80	0.942	2	5		
	21-30 years	151	3.62	0.971	1	5		
	> 30 years	100	3.53	0.979	2	5		
	Total	455	3.69	0.971	1	5	2.285	0.078
The school's annual work plan gives sufficient attention to the implementation of the goals and objectives of environmental education.	1-10 years	93	3.94	1.030	1	5		
	11-20 years	111	3.88	0.828	2	5		
	21-30 years	151	3.85	0.912	1	5		
	> 30 years	100	3.79	0.856	2	5		
	Total	455	3.86	0.905	1	5	0.437	0.727
The school where I work organizes a sufficient variety of extracurricular activities that contribute to the development of students' environmental culture (such as school space beautification, environmental conservation campaigns, collection of secondary raw materials, marking significant environmental dates, public lectures, exhibitions, and environmental pollution research, etc.).	1-10 years	93	4.08	0.924	2	5		
	11-20 years	111	3.96	0.924	1	5		
	21-30 years	151	3.97	0.927	1	5		
	> 30 years	100	3.89	0.942	1	5		
	Total	455	3.97	0.928	1	5	0.647	0.585
Environmental topics play a prominent role in the structure of students' extracurricular activities, especially within various clubs and groups.	1-10 years	93	3.84	0.912	1	5		
	11-20 years	111	3.77	1.009	2	5		
	21-30 years	151	3.77	0.903	1	5		
	> 30 years	100	3.87	0.849	1	5		
	Total	455	3.81	0.918	1	5	0.329	0.805
The school's educational programs (environmental protection program, cultural activities program, field trip and outdoor learning program, health care program, etc.) include sufficient content aimed at promoting environmental education and awareness among students.	1-10 years	93	**3.99**	0.903	1	5		
	11-20 years	111	3.90	0.873	2	5		
	21-30 years	151	**3.99**	0.876	2	5		
	> 30 years	100	3.98	0.752	2	5		
	Total	455	3.97	0.853	1	5	**0.298**	**0.827**
The school where I teach participates in environmental activities organized by institutions and organizations within the local and broader community and maintains ongoing collaboration with them.	1-10 years	93	3.98	0.921	2	5		
	11-20 years	111	3.97	0.958	1	5		
	21-30 years	151	3.91	0.919	1	5		
	> 30 years	100	3.89	0.909	1	5		
	Total	455	3.93	0.924	1	5	0.254	0.859

N-number of respondents; Min-minimum; Max-maximum; M-mean; SD-standard deviation; F-F test; p-significance

Table 7 presents the respondents' evaluations of the conditions in their schools that facilitate environmental education, considering the school location. The data indicate statistically significant differences for most items, highlighting varied opinions among teachers in urban, suburban, and rural areas regarding

the conditions that support the implementation of environmental education goals. Specifically, the mean values (M) show that teachers in suburban areas rate their schools' conditions for environmental education more positively (M=4.06). These respondents also rate their schools' organization of extracurricular activities that promote ecological culture more highly (M=4.22) and their schools' participation in community and environmental activities more favorably (M=4.00) compared to teachers in urban and rural areas. The statistical significance of these differences is confirmed by the F coefficient values. Additionally, respondents in rural areas, compared to those in urban and suburban areas, believe that their school's annual curriculum devotes substantial attention to environmental education goals (M=4.11) and that the structure of extracurricular activities is more supportive of these goals (M=4.03).

Table 7. Teachers' views on the school's conditions for achieving the goals and objectives of environmental education (variable: the school's location)

Statements about the school's conditions for achieving the goals and objectives of environmental education		N	M	SD	Min	Max	F	p
The school where I work has adequate conditions for the implementation of the goals and objectives of environmental education (teaching staff, organized school space, teaching materials, professional literature in the field of ecology, etc.).	Urban	341	3.65	0.975	1	5		
	Suburban	49	**4.06**	0.827	2	5		
	Rural	65	3.60	0.997	2	5		
	Total	455	3.69	0.971	1	5	**4.196**	**0.016**
The school's annual work plan gives sufficient attention to the implementation of the goals and objectives of environmental education.	Urban	341	3.81	0.951	1	5		
	Suburban	49	3.94	0.747	2	5		
	Rural	65	**4.11**	0.710	2	5		
	Total	455	3.86	0.905	1	5	**3.247**	**0.040**
The school where I work organizes a sufficient variety of extracurricular activities that contribute to the development of students' environmental culture (such as school space beautification, environmental conservation campaigns, collection of secondary raw materials, marking significant environmental dates, public lectures, exhibitions, and environmental pollution research, etc.).	Urban	341	3.91	0.948	1	5		
	Suburban	49	**4.22**	0.798	1	5		
	Rural	65	4.09	0.879	1	5		
	Total	455	3.97	0.928	1	5	**3.103**	**0.046**
Environmental topics play a prominent role in the structure of students' extracurricular activities, especially within various clubs and groups.	Urban	341	3.74	0.937	1	5		
	Suburban	49	3.94	0.876	2	5		
	Rural	65	**4.03**	0.809	1	5		
	Total	455	3.81	0.918	1	5	**3.245**	**0.040**
The school's educational programs (environmental protection program, cultural activities program, field trip and outdoor learning program, health care program, etc.) include sufficient content aimed at promoting environmental education and awareness among students.	Urban	341	3.92	0.875	1	5		
	Suburban	49	4.04	0.889	2	5		
	Rural	65	4.14	0.682	2	5		
	Total	455	3.97	0.853	1	5	1.942	0.145
The school where I teach participates in environmental activities organized by institutions and organizations within the local and broader community and maintains ongoing collaboration with them.	Urban	341	3.92	0.904	1	5		
	Suburban	49	**4.00**	0.935	1	5		
	Rural	65	3.97	1.030	1	5		
	Total	455	3.93	0.924	1	5	**0.223**	**0.800**

N-number of respondents; Min-minimum; Max-maximum; M-mean; SD-standard deviation; F-F test; p-significance

The assessments of respondents based on the number of environmental seminars they attended are presented in Table 8. The results from the F-test reveal statistically significant differences in only two items. These differences highlight varying opinions among respondents based on their training in ecological education within the school. Teachers who attended one environmental seminar rated the inclusion of environmental education goals and objectives in the school's annual work plan (M=4.20) and in extracurricular activities (M=3.98) more positively than other respondents. However, the data do not show statistical significance for other statements regarding the school's conditions for environmental education, suggesting that teachers' evaluations of these conditions are similar regardless of the number of environmental seminars they attended.

Table 8. Teachers' opinions on the conditions of the school for the implementation of the goals and objectives of environmental education (variable: number of attended environmental seminars)

Statements Regarding School Conditions for Implementing the Goals and Objectives of Environmental Education		N	M	SD	Min	Max	F	p
1. The school where I work has adequate conditions for the implementation of the goals and objectives of environmental education (teaching staff, organized school space, teaching materials, professional literature in the field of ecology...).	None	404	3.66	.977	1	5		
	One	46	3.98	.906	2	5		
	Two	3	3.67	.577	3	4		
	Three	2	3.00	.000	3	3		
	Total	455	3.69	.971	1	5	1.842	0.139
The school's annual work plan gives sufficient attention to the implementation of the goals and objectives of environmental education.	None	404	3.84	.899	1	5		
	One	46	**4.20**	.806	2	5		
	Two	3	3.00	1.000	2	4		
	Three	2	2.00	.000	2	2		
	Total	455	3.86	.905	1	5	**6.084**	**0.000**
The school where I work organizes a sufficient variety of extracurricular activities that contribute to the development of students' environmental culture (such as school space beautification, environmental conservation campaigns, collection of secondary raw materials, marking significant environmental dates, public lectures, exhibitions, and environmental pollution research, etc.).	None	404	3.95	.932	1	5		
	One	46	4.20	.885	2	5		
	Two	3	3.67	.577	3	4		
	Three	2	3.00	.000	3	3		
	Total	455	3.97	.928	1	5	1.798	0.147
Environmental topics play a prominent role in the structure of students' extracurricular activities, especially within various clubs and groups.	None	404	3.80	.917	1	5		
	One	46	**3.98**	.882	2	5		
	Two	3	3.00	1.000	2	4		
	Three	2	2.50	.707	2	3		
	Total	455	3.81	.918	1	5	**2.694**	**0.046**
The school's educational programs (environmental protection program, cultural activities program, field trip and outdoor learning program, health care program, etc.) include sufficient content aimed at promoting environmental education and awareness among students.	None	404	3.96	.856	1	5		
	One	46	4.15	.816	2	5		
	Two	3	3.33	.577	3	4		
	Three	2	3.00	.000	3	3		
	Total	455	3.97	.853	1	5	2.171	0.091
The school where I teach participates in environmental activities organized by institutions and organizations within the local and broader community and maintains ongoing collaboration with them.	None	404	3.92	.925	1	5		
	One	46	4.17	.851	2	5		
	Two	3	3.33	1.155	2	4		
	Three	2	3.00	1.414	2	4		
	Total	455	3.93	.924	1	5	2.205	0.087

N-number of respondents; Min-minimum; Max-maximum; M-mean; SD-standard deviation; F-F-test; p-significance

Discussions

The data obtained from the first research task confirm the hypothesis that teachers positively assess the importance of studying environmental topics during the first cycle of primary education. The mean values show that respondents highly value various aspects of environmental education, with the highest ratings given to the third and fourth items: that studying environmental topics significantly contributes to the development of students' environmental awareness (M=4.54) and that students acquire the knowledge, skills, and values necessary for solving environmental problems through these topics (M=4.40). The results demonstrate strong agreement among teachers regarding the need for the early and systematic introduction of environmental topics into the curriculum, in line with contemporary environmental trends and the demands of education for sustainable development. Teachers' positive opinions can be attributed to the fact that primary school is a critical period when children are highly receptive to new knowledge, making it easier to nurture desirable environmental attitudes and beliefs. Additionally, this phase is crucial for achieving various educational and environmental goals and objectives (Brun, 2001).

When examining differences in teachers' opinions on the importance of studying environmental topics in the first cycle of primary education in relation to work experience, the results of the ANOVA analysis show no statistically significant differences based on years of teaching experience. This suggests that teachers, regardless of their years in the profession, have similar views on the importance of environmental education for students. Similarly, no significant differences were found based on the school's location, although teachers in rural areas expressed a slightly more favorable perception. Teachers working in rural schools, in particular, emphasized the importance of developing students' environmental awareness and involving them in solving environmental issues, which may reflect a closer connection to nature and heightened awareness of local environmental challenges. Regarding the number of environmental seminars attended, no statistically significant differences were observed in teachers' assessments of the importance of implementing environmental education topics. The data suggest that teachers who attended one environmental seminar expressed slightly more favorable views on the importance of studying environmental topics compared to those who did not attend any seminars. Although these differences were not statistically significant, they hint at the potential influence of additional professional development on teachers' opinions regarding the integration of environmental topics into the curriculum.

Based on the results of the research related to the first research task, it can be concluded that teachers acknowledge the importance of introducing and studying environmental topics from grades 1 to 4 in primary school. This view aligns with the developmental characteristics of children in this age group and the strategic goals of education for sustainable development.

The second research task focused on determining teachers' opinions on how specific school conditions, where they teach, influence the achievement of environmental education goals. The findings reveal that teachers have similar evaluations of the school conditions that contribute to students' environmental education. The mean values across all items, ranging from M=3.69 to M=3.97, reflect positive assessments by respondents regarding this aspect. The data indicate that extracurricular activities and the incorporation of environmental topics into various educational programs have the most substantial impact on fostering students' environmental awareness.

To determine differences in teachers' opinions based on work experience and the number of environmental seminars attended, variance analysis reveals that differences exist for only a few statements within the scale on school conditions for students' environmental education. Regarding work experience, a difference was observed only in the assessment of the representation of environmental topics in the school's curriculum. Teachers with fewer years of experience (1 to 10 years) and those with more extensive experience (21 to 30 years) rate the inclusion of environmental topics in various school programs more positively compared to other groups. The number of environmental seminars attended does not significantly affect teachers' opinions on school conditions supporting students' environmental education. However, teachers who attended one environmental seminar rate the representation of environmental topics in the annual work plan and extracurricular activities more favorably than others. This suggests that additional teacher training can lead to more positive evaluations of environmental conditions in schools, while also indicating that other factors beyond professional development may influence teachers' perceptions.

An analysis of the data regarding the location of schools revealed statistically significant differences in teachers' perceptions of how school conditions impact the implementation of environmental topics. Teachers in suburban areas rate the conditions more favorably for environmental education compared to those in urban and rural areas, particularly regarding extracurricular activities and the organization of environmental initiatives in collaboration with the local community. Teachers in rural schools also report better planning of environmental activities compared to their urban counterparts. These findings suggest that schools in suburban and rural areas may have more favorable conditions or resources for environmental activities, potentially due to the influence of the local community's involvement in environmental protection efforts.

Although there are differences in respondents' assessments of certain statements related to the independent variables examined, the results from the second research task indicate that teachers generally evaluate their school's conditions for achieving the goals and objectives of environmental education positively.

In conclusion, the data support the overall research hypothesis that primary schools play a crucial role in students' environmental education and that, through their broad potential, they significantly contribute to the development of students' environmental awareness.

Conclusions

The results of the research underscore the importance and necessity of systematically integrating environmental topics into the first cycle of primary education, as this period is a critical developmental stage for shaping students' environmental awareness. Teachers' positive attitudes toward including environmental topics in the curriculum reflect a strong consensus on the importance of these subjects for acquiring the knowledge, skills, and values necessary for environmental protection and addressing ecological challenges.

The ANOVA test results show that work experience, the number of seminars attended, and the school location have a limited impact on teachers' attitudes regarding the significance of environmental topics, suggesting consistency in their views on the importance of environmental education. However, a slightly more favorable perception among teachers in rural areas suggests that their closer connection with nature may influence their more positive attitudes toward environmental education.

Regarding the conditions necessary to achieve the goals and objectives of environmental education, most teachers consider their school's conditions satisfactory. Nonetheless, differences based on school location highlight the need for additional resources and support, particularly in urban areas. Teachers in rural and suburban schools tend to assess the conditions for environmental education more positively, particularly with regard to extracurricular activities and collaboration with the local community. This suggests that the school's context and its connection to nature play a significant role in fostering students' environmental awareness. With respect to professional development, teachers who have attended one seminar on ecology expressed more favorable attitudes, indicating that additional training may enhance the effectiveness of environmental education.

In conclusion, the analysis supports the hypothesis that primary schools, through their curriculum and extracurricular activities, play a vital role in developing environmental awareness and promoting a responsible attitude toward the environment among students. The research also paves the way for further studies, especially in exploring the impact of additional teacher education and improving institutional support, both of which could contribute to more effective achievement of environmental education goals.

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Conflict of interests

The authors declare no conflict of interest.

Author Contributions

Conceptualization, A.S.S., I.T.M., A.S., T.M.Đ.; methodology, A.S.S., I.T.M., A.S., T.M.Đ.; software, A.S.S.; formal analysis, A.S.S. and T.M.Đ.; writing—original draft preparation, A.S.S., I.T.M., A.S. and T.M.Đ.; writing—review and editing, A.S.S., I.T.M., T.M.Đ., A.S. All authors have read and agreed to the published version of the manuscript.

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